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Q&A With John Gibbons

A Frank Conversation With Clinton's Science Advisor

John H. Gibbons, President Clinton's Assistant for Science and Technology, has emerged as one of the workhorses of the White House inner circle, in frequent contact with the President and especially close to Vice President Gore. Keen environmentalists, Gibbons and Gore long ago linked up on Capitol Hill, where Gibbons headed the Congressional Office of Technology Assessment and Gore staked out science-related issues during service in the House and Senate. One of the earliest Clinton appointees, Gibbons also serves as Director of the White House Office of Science and Technology Policy. Gibbons spoke with SGR Editor Greenberg on September 3. Following is the text, transcribed and edited by SGR.

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SGR. *There's a lot of low morale out there in the science and technology communities. For instance, the* Wall Street Journal *reported yesterday that high-tech industry feels it's been let down. After seven months, what do you say to these people who say they expected better?*

Gibbons. I think the thing that's overriding is that we've gone from a time in which we had an expanding future, in terms of resources, both in the corporate sector and particularly in government, to a time in which we're under enormous constraints, constraints driven by things with unbelievable momentum, such as health-care costs. Instead of borrowing more and more from the future, which is just putting us into a deeper and deeper hole, we're now having to come to reality with working within our means. The research community, along with everyone else, is going to have to take some hits. Then the earlier visions of 3-4-5-6 percent real increase of resources every year soon become a non-reality.

We have neglected a lot of things in this country for a long time. Those that are in industry also have to understand how governance works in today's world—that in government, you can't make decisions like you can in industry. You've got a lot more reactors, a lot more constraints operating in the system.

SGR. *What would be an example of that in your experience here?*

Gibbons. Take NASA and our attempt not only to do a [space] station that's doable, and internationalize it and make it so that it counts for something, but also as a way in a sense reorganizing that agency. And the defense conversion, too. Every time you get to a base closing or a NASA conversion, or what have you, there are these enormous buffering processes that set in that run all the way from the private sector to all the other stakeholders involved.

We've been wrestling for months in trying to work out with Detroit a new kind of a partnership in technology to get past some of the things that still make the automobile a big factor in the pollution equation and dependence on imported oil. By the time you add all of the interests of the federal agencies and the Congress and the automobile industry and its suppliers and labor, you're dealing with an extremely complicated process. It can be discouraging compared to making a corporate decision governed by very simple market place rules.

SGR. *Should the research community reconcile itself to a prolonged period of no growth?*

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In Brief

The only research-related institution pinpointed for extinction in Vice President Gore's masterplan for re-hashing government is a seasoned survivor of many prior attempts, the Uniformed Services University of the Health Sciences, the Pentagon's own medical school, in Bethesda, Md. Created in 1972 by Congress over DOD's protests, USU has since acquired many influential friends. Echoing past criticisms, the Gore report says USU provides a mere 10 percent of the armed services' physicians, at $562,000 apiece, five times the cost under the Health Professionals Scholarship Program. Relying on the country's 125 civilian medical schools would save DOD $300 million over five years, the report claims.

The Department of Energy, second only to Defense as a wastrel in R&D, got off with a light rap in the Gore report, which states: "DOE will review its labs, weapon production facilities, and testing sites in the context of its mission—and will recommend the phased consolidation or closure of obsolete or redundant facilities." DOE has been through this exercise many, many times—without significant effect.

NIH goes unmentioned in the report, and the only reference to NSF says that it "should push forward with efforts to implement advanced information technology in the proposal, submission, review, award, and information dissemination areas."

The report, National Performance Review Overviews *(GPO Stock No. 040-000-00592-7; 176 pp., $14 in the US; $17.50 foreign), is available from: Superintendent of Documents, PO Box 371954, Pittsburgh, Pa. 15250-7954; tel. 202/783-3238; fax 202/512-2250.*

. . . "No One Is Going to Escape Budget Constraints"

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Gibbons. I think the research community is going to need to reconcile itself to that, despite the fact the Administration is explicitly giving it special treatment, no one is going to escape the really tight clamp of severe budgetary constraints in the next several years while we try to get the deficit reduction in place.

SGR. *You say "special treatment." Where does that manifest itself?*

Gibbons. It manifested itself in, for instance, the legislation that went to the Congress for what was called a stimulus package. There was an increase for NSF and for some other things. I think you will see it manifested in the way we treat the R&D budgets, and try to build fences around those, to at least keep them from going down. So, the winners in the near term are those that are going to hold on to real spending power. But anybody that expects our earlier traditional rapid expansion of the support of science is not being very realistic.

SGR. *So, realism calls for recognizing that the period of robust growth is over.*

Gibbons. Or at least there is an intercession here, when everyone has to take part of the hit. I wish I could be more optimistic about it. But let me add, every time I've been with the President and the Vice President, and the subject comes up, there is a reiteration of their conviction that the means to grow, the means to dig your way out of the hole, simply can't be done just by cutting things. You've got to make investments.

And one of the most assured long-term payoff investments of the public sector is in research. And that's why they keep giving attention to the R&D budgets, because they see that as the engine that helps drive us out of the hole.

SGR. *But looking at what's been happening with the R&D budgets in the early days of this Administration, it's plain that they have not been particularly favored. For example, NIH is at a standstill, and those people have lived for 35 years with growth papering over their problems. NSF was in for $207 million in the stimulus package. Whether or not that has reappeared is a matter of ardent debate.*

Gibbons. That's right.

SGR. *Has it reappeared?*

Gibbons. Well, Congress pretty well diced that one up. And what we hope is that it can be resurfaced in the '95 budget [for the fiscal year that begins October 1, 1994]. I think you're right. But, we do spend $76 billion a year in R&D. It's not as though there's a zero sum out there. The question is how well can we use those resources, how flexible are they to move in terms of reoptimizing in the post-Cold War world. A big challenge now is to shift our focus from the defense side of the ledger over to the civil side of relevance and sustain it with the underpinning of basic science.

SGR. *There's not going to be much growth, if any. So, it's redeployment within an essentially fixed sum. From what to what?*

Gibbons. First of all, a lot of the defense technologies that were relevant in the Cold War certainly aren't relevant now. We see major decreases coming over the Department of Defense in that regard. As those funds become available, we hope to increase support at the Department of Commerce for the National Institute of Standards and Technology, and support of NIH and NSF in the basic sciences. And that's where one should expect to see these funds re-emerge. We want to keep the universities alive. They've got a lot of problems, both capital and research problems. There was an earlier indicated cut on university overheads which could have been tremendously negative in terms of the influence on the university community. And the Administration got that straightened out, I was pleased to see. And that's another sign that says they're going to try to correct things when they see them running the wrong way.

Another thing we're trying to do is to understand more clearly where these $76 billion go. It's not all that well understood. We used to divide it up into basic research, applied research, and some other things. But that doesn't really tell you, for instance, how much money are we spending on research related to education and training. Because it goes across a bunch of different agencies.

SGR. *Are you making a special effort to find out?*

Gibbons. For the '95 budget, as far as we can go, and even more so in '96, we're trying to recast the R&D in a way that will enable us to be much more accurate in seeing just how these dollars are flowing with respect to some over-arching national goals, whether it be health, environment, housing, education, defense. It picks up and extends the FCCSET work [Federal Coordinating Council for Science, Engineering, and Technology, whose role in harmonizing federal R&D was expanded during the Bush Administration]. OMB [Office of Management and Budget] and OSTP have been working together on this, and we have already sent some terms of reference to the agencies, and they are beginning to do this in the '95 budget with respect to advanced computers, national information systems, the global environmental-change issues, education and training, advanced manufacturing.

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. . . Let's Say You Were an Academic VP for Research

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There are probably about 10 or 11 of these things, but we're trying to get four this way as a way of learning how to do this process, and then in '96 we'll try to extend it.

SGR. *The basic strategy, then, is redeployment from the defense budget. But the defense community is digging its heels in, and Secretary Aspin is pretty much in harmony with them, saying no more, we can't go any lower.*

Gibbons. When he talked about not going any lower, he was talking about his force structure. They clearly are concerned about the research budget over there, as well. And there are arguments, on the one hand from some people in the defense community that say we've got to have funds for hardware and ammunition and force deployment capability and the likes, and therefore we have to take it out of research. Others say your mother lode is the research side of things; if you're going to do the same job with less resources, then you've got to use your ingenuity, and that means your R&D budget has to be preserved.

SGR. *Is there a decision on the part of this Administration as to whether, in a time of less procurement, one emphasizes research, or do you lift from research to enhance procurement?*

Gibbons. Our argument is that one should be extremely cautious about dipping anywhere into the research budget in order to procure goods and services. If you can build any fences, as in these other areas, that's where you ought to have your protection. At the same time, as every industrialist knows, one of the first things he thinks about when he's under constraints are his so-called discretionary costs. And guess what's in the top of the list of discretionary spending? It's your research and development.

SGR. *Erich Bloch [former Director of NSF] used to accuse the Pentagon of taking a free ride on the support provided by civilian research agencies. Does the Defense Department retain a role in providing support to the universities?*

Gibbons. I think they would agree, yes, they do, but they're also constrained by Congressional caveats on that business, and also by their own budgetary constraints as they downscale. The concern that the President and others have is how fast can you go in moving this economy around without some things cracking and breaking. We already see enormous regional and local impacts, and we have some crazy ways of spending money, but it's in a sense to try to keep the rate of change accommodatable at a regional and local level, and that's tough to do.

SGR. *Given this picture of an era of constraints, what is the wise strategy for the institutions of science to adopt? Let's say you were vice president for R&D at a major university trying to look ahead five years.*

Gibbons. We're sort of all muddling through now. But surely, if I were a research VP at a university, I would want to try to see if I couldn't encourage my people to think about the relevance of their work in terms of some overarching national goals and objectives, one of which is exploration, the development of new knowledge, knowledge for its own sake. But there are many others: environmental, health, habitat, communication, transportation, and others. And the extent to which my work can help add to the knowledge base that's directly relevant to those things of high priority gives me some assurance that there are going to be some people out there, if logic prevails, that are going to want to support the work I want to do.

I think the whole business of materials flow, as well as materials properties, as an example, are both very interesting and important. Materials properties, because that's where the mother lode is in terms of new ways to provide goods and services with less of an environmental and resource impact. And material flows as a way of thinking how we can use our ingenuity to provide the goods of our society without so many bads. And both of those have underpinning them a lot of very important areas of research. And they're bound to be of interest to society, as long as society remains interested in environmental quality and health and these other issues.

SGR. *A lot of people in academic research take perverse pride in their work having no relevance; it's a badge of honor. You're asking for an enormous cultural shift.*

Gibbons. Curiosity-driven research though—we've talked explicitly about that in this Administration as being a traditional, honorable, and legitimate national goal, along with these others. And if it's damned good curiosity-driven research, as judged by peers, then it ought to receive the support of that portion of our national economy that we commit to that.

SGR. *When you get down to the realities of the peer-review system and agency priorities, and what's appealing to Congress, won't curiosity-driven research be at a disadvantage?*

Gibbons. But then that puts the challenge back to the scientific community to explain why we should be excited about what they're doing. Let me add, I'm very pleased at the appointments of Harold Varmus [for Director of NIH] and Neal Lane [for Director of NSF], because they should be seen as a direct signal that the Administration wants people of outstanding academic credentials and standing, because that's what we feel should be the central focus of these agencies.

SGR. *Do they come aboard with any particular marching orders?*

Gibbons. Nope. We just wanted the very best kind of people we could get, but representative and derived from that community.

SGR. *Many young people now emerging into the scientific system are in despair about finding suitable jobs. They feel the future is very bleak for them.*

Gibbons. I don't think the long-term future is bleak at all,

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. . . Jobless Scientists Should Look to Other Fields

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because we're going to survive by virtue of our scientists and engineers, our people who have good heads on their shoulders and exercise their brains. At the same time, we know we're in an interregnum in which we have thousands and thousands of engineers coming out of the deficit-financed earlier federal budgets, and you can't both cut your deficit and also hire more people. And we know also that a lot are coming out from the downsizing of industry, where bottom-line profits are going up and employment going down. I'm sympathetic with the fact that there are enormous pressures in the job market.

SGR. *For someone who is out of work, the prophecy of a bright long-term future is in some ways reassuring, but the here and now are the problems of the moment. What do you say to a young person who has a fresh degree in engineering and there's no job?*

Gibbons. First of all, I don't think there are no jobs. There are a lot of jobs.

SGR. *Relevant to his or her training?*

Gibbons. Even relevant to training. I'm in a job that only very peripherally uses my original training as a physicist. So, I think one thing for sure is that when people come out of graduate school, they shouldn't necessarily think that their future is going to be to continue to do what they did for their thesis. Or even maybe to continue to stay in the field that they took their degree in. They will find it not only possible but very frequently enlivening to take those skills and apply them in some new kind of context.

SGR. *For later in career, that has often been the case, but someone who has a degree in a particular field, especially a highly technical field, usually hopes that upon graduation, there will be an opportunity to practice in that field.*

Gibbons. There are a lot of opportunities, but not as many as there have been. I don't think there is a magical solution to that. I do know that thousands upon thousands are finding good, new jobs. But that's because other people are retiring or because there are new things starting. For example, "green" technology is not only a rapidly expanding business but full of opportunities for creativity in engineering and science. How do we provide goods and services in a way that is less costly in terms of the so-called externalities?

SGR. *Bitterness has been expressed about scientific superstars from Russia getting jobs here that previously would have been filled by Americans.*

Gibbons. You're right. We not only have these people displaced from the downscaling of defense and from the downsizing of the private sector, but we also have international refugees. I think most of the Russian mathematicians have left Russia at this point. There have been an extraordinary number of them. They're very fine mathematicians. So, you're a chancellor at a university, and one of these superstars immigrates. Do you give him or her a fair shot at that job, or do you strictly buy American? I don't know the answer to that.

SGR. *Does this Administration have any concern about scientific and engineering unemployment that goes beyond saying, yeah, it's unfortunate?*

Gibbons. Well, we have a concern that we don't want to see people underutilized. One of the great tragedies of today's market is we have a lot of people who are underemployed, whether it be in science, engineering, or math or other kinds of skills. But there's also a limit to what the federal government, it seems to us, should do as the provider of these opportunities and options. We want to try to make the seed ground for employment as rich as we can make it. That's why we've been trying to encourage and focus, for instance, on small business, because that's where the new jobs are. It's in these new entrepreneurial areas that a lot of these young people are going to find some very good opportunities.

SGR. *Then the approach to the problem of employment for highly trained scientists and engineers is to juice up the economy, rather than attempt any pinpointed programs in which federal agencies would take on extra people just to tide them over.*

Gibbons. It's hard to say that we can take on a whole bunch of extra people to tide them over at the same time the budgets are coming down. My office right here is running on 25 percent fewer people than it did in prior years. And it's sort of a law of conservation. The numbers have to add up.

SGR. *There is encouragement that comes from the government, and from society in general, for young people to steer their careers toward science and technology. Is it conscionable to encourage someone to go into a field for which the future, if not bleak, is quite clearly very uncertain?*

Gibbons. There's the old story of someone who said, how you doing? And the answer was, compared to what? And it seems to me that if you have a society that increasingly is going to be dependent on using its intellect for the future, then those that have developed their intellect most fully are going to have the greatest number of opportunities. Not only opportunities when they come out of school, but a capability to change with the changing nature of the workplace itself. They need to know that in today's marketplace, versatility and flexibility are as important as a particular kind of a skill.

SGR. *So, a different mindset is needed on the part of young people as they contemplate their training and their careers.*

Gibbons. And also an understanding that there are a lot of very interesting activities out there in addition to the one they particularly trained for specifically in graduate school. The old theory was that if you graduated, let's say, from Harvard in physics, then your mission is to go teach physics somewhere else and have your graduate students also, and anything else is a lower horizon. Well, I think that's nonsense.

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. . .Agricultural Research Should Reconsider Priorities

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SGR. *One budget sector that seems to have come up hard against the constraints, maybe more than any of the others, is agricultural research. Why doesn't this Administration feel that this should be an area of vigorous growth, considering the environmental problems, food problems, pesticides?*

Gibbons. Agriculture has a long tradition of research, but a lot of people feel that with the same dollars, they should be doing some other things. So, to first order, [the Department of] Agriculture, as an example, ought to figure out what's the most important thing they should be doing in research.

SGR. *There are bookshelves full of reports from the Academy, OTA, everyplace, saying Agriculture should be doing this or that in research. Are they to go back to the drawing boards now and say we want to reorient the Agricultural Research Service or the Cooperative State Research Service toward something else?*

Gibbons. That may be their best source of funding in the next several years.

SGR. *Is it the Administration's position, then, to the extent that you can discuss a position on this subject, that Agriculture has to sort itself out before it can expect some growth?*

Gibbons. To first order, what we figure is every agency has to look homeward, angel, first, and say, what can we as an agency do to reoptimize our resources, our people, our productivity, to be better, more efficient, more productive, more client-oriented, more user-friendly? And can we set our priorities, not only within the framework of our own agency, but through FCCSET [Federal Coordinating Council for Science, Engineering, and Technology], across a wider cut of things? How can we reorient those resources? If you're sufficiently compelling, you're going to find some new resources. But, to first order, what should we be doing internally to make funds available for these highest priorities? And obviously, we should look at our lower priorities.

SGR. *That assurance you gave that, if you do it right, you'll get new resources, is that a hope or a principle?*

Gibbons. The answer is Yes.

SGR. *The Super Collider: Why has the Administration lashed itself to this albatross?*

Gibbons. The Administration inherited a lot of things with a lot of, however you want to describe it, momentum or inertia. Here we have the largest scientific instrument ever built, well under way, damn good science, well engineered, conservatively, but well engineered. It's in a region heavily impacted by defense conversion. Enormous worldwide interest, but the early Administration [Reagan's] tied it to a US-only kind of endeavor, which was, I think, a dreadful error. And so what does the new Administration do to that situation? Do you try to walk away from it, that is, to walk away from, I call it a magnet for bright minds? It would attract an enormous international community of support. So, we said, all right, let's continue to support it because it's excellent science, and it's well under way—there's a lot of momentum there. But we're going to cut it down to manageable annual costs. So, let's see what we can do by way of stretchout or other mechanisms, to get this thing more affordable. There are only two ways to go: one is to stretch it out in time, and the other is try to use part of that extended time to encourage and engender increased international support.

SGR. *Is the illusion of international support still alive? The Japanese have been studying this very thoughtfully for about five years now and are yet to provide any support.*

Gibbons. I get letters every day from people in academies of sciences and other organizations all around the world about their interest. But people aren't going to come forward with their support if they are uncertain about whether or not, not only the federal government but even the State of Texas [which has pledged $1 billion] is going to go beyond the next year. So, you're caught in the dilemma. If you solemnly commit to completion—and that's up to Congress—then I think that opens the gate for these other countries to be able to come forward with meaningful support, including Japan. But if we don't set that commitment ourselves, then we can hardly expect those folks to come forward and say, sure, we'll throw in with you.

SGR. *Do you think the SSC has reached that magical but undefinable point where it's too late to turn back?*

Gibbons. I remember a big hole down in Tennessee where they tried to do the Clinch River Breeder Reactor, and they ultimately filled up the hole. Congress is going to have to wrestle with it. We don't know the outcome.

SGR. *The Space Station: In your early days here, you said something to the effect that it wouldn't be the end of the world if Congress terminated it.*

Gibbons. Few things mean the end of the world. The Space Station has gone through an absolutely extraordinary innovative evolutionary period driven by the attempts of this Administration to turn a sow's ear into a silk purse. We decided early on that the Station as it was moving just was not going to fly. And we found later it would have never flown. NASA was so ill-organized that they never could have gotten any Station off the ground. So, we decided we'd try to go for a redesign to make the best of a pretty bad situation.

We had to get to a realistic budget for NASA, we had to get NASA reorganized to be able to do it, and had to pay close heed to the commitments we've made to our international partners, which included votes of the Diet in Japan. They're very formal commitments that we inherited. We gave great weight to the fact that we had these commitments and these countries had already committed funds. We also took into account that this again affected a part of our country, across from California to Florida and up in the midwest already very heavily impacted by our attempts to downscale the defense

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. . . Planning to Revive Presidential Advisory Council

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sector.

And we established this internal study, and the more we looked at it, the more interesting things got about what one might really be able to do with this thing. We established under Chuck Vest [President of MIT] this independent commission to keep an eye on it. And that moved down through the spring to where we found you could do some very interesting things for a lot less money and also reorganize NASA while you're at it.

And then in the early summer, with the Russians, things got even more interesting in terms of a further internationalization of the effort. And that just culminated yesterday in an agreement to spend some time firming up our ideas between now and November to move bilaterally with Russia on some things as well as to quite possibly incorporate them into a truly international venture.

We've gotten costs down by some innovative engineering that has popped up in the course of this work, using components that already existed from other activities and the likes. And we have found now a situation where, embodied in the Space Station is not only a major venture in big science and big technology, but the largest international venture ever undertaken by countries in history, other than fighting wars together or against each other.

So, we have a whole new ballgame of international venturing built around this Station. We are reorganizing NASA along with it. They're going to have some early outs for people and retirements are going to downscale themselves. We're going to be putting more money into aeronautics and other of the traditional things that were about to be crowded all the way out by the earlier Station. So, I have gone from being a neutral-to-skeptic when I came into this job to being one that thinks this is most worthy.

SGR. *Are you an enthusiast now?*

Gibbons. Well, I don't know whether I'd call myself an enthusiast. But I do feel that what we have here is a very exciting, very sound venture that is a breakout in terms of learning how to do very complex systems in an international setting with cost-sharing a lot of very interesting potential rewards, not just in new technology and in science, but also in ways of working together.

SGR. *Where do the science and technology agencies come out in the Administration's plans for "reinventing government?"*

Gibbons. I would think part of it would be the reorientation of the federal laboratories to be much more explicitly engaged in the process of understanding, in an active and aggressive sense, the potential relationship between what they're doing and what non-agency needs and opportunities are out there in the civilian sector.

SGR. *There people who say the best thing you could do for the country would be to close down some of these national labs and redirect the money to other purposes.*

Gibbons. I think undoubtedly, some of the national labs are going to be changing in the course of this process.

SGR. *We know they will be changing, but will they be closing?*

Gibbons. They might be closing, they might be converting. Few would argue that we should have two [nuclear] weapons development labs. The question is, what should happen to those resources. There are some very bright people and some very interesting equipment there. Should we walk away and padlock it?

I doubt that's a very sensible idea. But exactly what to do is an issue right before us this winter. But it's something we're not going to take a precipitate step in, except to say, as far as I'm concerned, we don't need two weapons development labs anymore.

Also on reinventing government, we have proposed folding FCCSET along with the Space Council and the Critical Materials Council into a single Cabinet-level Council called the National Science and Technology Council—the NSTC. It would encompass all these functions, and it would provide the kind of clout requisite to begin to orchestrate the overall R&D budget in a much more meaningful way than just a little bit of tweaking within agencies. OSTP would stay OSTP; it would serve as a staff.

SGR. *Are you going to have something along the lines of Bush's President's Council of Advisors for Science and Technology?*

Gibbons. Yes. The second half of my proposal to the President is to create a President's science and technology advisory committee that would be strongly representative of science but also contain some technology people. And that this would serve as one of the principal links between the private sector and the NSTC, and could assist this so-called FCCSET-type process to assure that we have the right kind of dialog and input from the private sector.

These proposals are being reviewed this week by the other agencies. And it was independently recommended in the Reinventing Government that something like this be done. This finally gives teeth to what was otherwise a very interesting convening authority under FCCSET, but it never really had the decisionmaking capabilities. That's what we hope to get.

SGR. *You came to this job with probably more Washington experience than all of your predecessors put together. Did you encounter any surprises, nonetheless?*

Gibbons. I guess I had been away from the White House long enough to have forgotten all of the extraordinary things that obtain here, namely, the rate at which your plans change every day, the small amount of time you have to make decisions in. I think there's inherent chaos in governance, and the closer you get to the center of power, the more you have to learn how to live in a chaotic environment, but not be chaotic yourself. So, I've relearned a lot about how to work in this environment.

More IN PRINT: Foreign Aid, Women Engineers, Etc.

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these expenses as an additional cost of doing business." After two decades of negotiations, the Convention was opened for signatures in January, with July 1995 as the agreed goal for entering into force. The report is part of an OTA series; due this fall: *Proliferation of Weapons of Mass Destruction: Assessing the Risks* and *Technologies Underlying Weapons of Mass Destruction.*

Also from OTA: ***Development Assistance, Export Promotion, and Environmental Technology*** (GPO Stock No. 052-003-01331-2; 98 pp., $6.50), discusses problems and export opportunities in linking foreign aid to environmental goals. "Opinions are divided," says the report, "about whether orienting US aid more toward the direct promotion of environmental exports would compromise or further environmental protection and development goals." The report, requested by the House Foreign Affairs Committee, is second in an OTA series on American Industry and the Environment that began in May 1992 with *Trade and Environment: Conflict and Opportunities* (GPO Stock No. 052-003-01282-1; 120 pp., $5.50).

Another from OTA: ***The Future of Remote Sensing from Space: Civilian Satellite Systems and Applications*** (GPO Stock No. 052-003-01333-9; 199 pp., $14), cautions that as capabilities for gathering data from space are expanding rapidly, more resources and attention should be directed toward management, storage, and distribution. The report states that "Although NASA has demonstrated the ability to collect data from a variety of instruments, it has been less successful in making effective use of them."

Order from: New Orders, Superintendent of Documents, PO Box 371954, Pittsburgh, Pa. 15250-7954; tel. 202/783-3238; fax 202/512-2250.

A National Survey of Women and Men Engineers: A Study of the Members of 22 Engineering Societies, from the Society of Women Engineers (44 pp., $20 for members, $40 for others), says women engineers far outdistance men in believing they are victims of inequities at work; also that at age 30, salary differentials favorable to men set in and continue to grow. On non-gender items, the survey found that 60 percent of the respondents have gone through at least one major reorganization in the workplace in the last five years. The survey, covering 2000 engineers, was supported by the Conoco Corp., the General Electric Foundation, the General Motors Foundation, and the Alfred P. Sloan Foundation.

Order from: Society of Women Engineers, 120 Wall St., 11th Floor, New York, NY 10005-3902; tel. 212/509-9577; 800/666-1-SWE; fax 212/509-0224.

International Research Centers Directory: 1994-95 (1585 pp., $410), seventh edition, lists 7600 academic, government, and commercial research organizations in over 150 countries—not including the US and Canada, which are covered in *Research Centers Directory: 1994* ($455). Virtually all fields of research are included. Entries include name, address, and purpose of the organization, affiliations, senior officials, telecommuncation numbers, publications, etc.

Order from: Gale Research, Inc.,PO Box 33477, Detroit, Michigan 48232-5477; tel. 1/800-877-4253; fax 313/961-6083.

Global Dimensions of Intellectual Property Rights in Science and Technology (442 pp., $49.95 in US, Canada, and Mexico; $60 overseas; all orders, $4 for shipping), from the National Academy of Sciences, a collection of papers, many presented at an NAS conference in January 1992 chaired by Albert R.C. Westwood, Vice President, Research and Technology, Martin Marietta.

Order from: National Academy Press, 2101 Constitution Ave. NW, Box 285, Washington, DC 20055; tel. 1/800-624-6242; in Washington, DC, area: 202/334-3113.

Job Changes & Appointments

Luis Sequeira, newly retired as Professor of Plant Pathology and Bacteriology at the University of Wisconsin, Madison, has been nominated to be Assistant Secretary of Agriculture for Science and Education, one of the last senior science vacancies remaining in the Clinton Administration.

Terry Cornwell Rumsey, Manager of Policy and Government Affairs in the Xerox Corporation's Washington office, has been appointed Director of the Office of Science Education and Technical Information at the Department of Energy.

Madeleine Jacobs has resigned as Director of Public Affairs at the Smithsonian to become Managing Editor of *Chemical & Engineering News.*

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IN PRINT: Pork Funding, Asian R&D Manpower, Etc.

The publications listed are obtainable as indicated—not from SGR.

Academic Earmarks: An Interim Report by the Chairman of the Committee on Science, Space, and Technology (42 pp., no charge), latest launch in Rep. George Brown's futile campaign to curb his Congressional colleagues' zest for eluding conventional review mechanisms and delivering earmarked, or pork-barrel, funds to local colleges and universities. What the porkers regard as a triumph, Brown (D-Calif.) considers a sin against wise use of scarce resources. But with hometown service a boon to reelection, Brown's campaign is widely regarded on Capitol Hill as a menacing eccentricity.

According to the report, the pork derby produced 499 separate appropriations last year—nearly doubling the 1991 count—for a grand total of $708 million. The report lists schools reaping big bucks, with the University of Alaska tops at $45 million and Boston University second, with $29 million. Also listed are the most accomplished legislators in this business, plus helpful lobbyists on the Washington scene. Brown held an earmarks hearing in June, and has another scheduled for September 15.

Order from: Committee on Science, Space, and Technology, 2320 Rayburn House Office Building, attn. Cheryl Faunce, Washington, DC 20515; tel. 202/225-4275; fax 202/225-8280.

Human Resources for Science and Technology: The Asian Region (NSF 93-303; 142 pp., no charge), a welcome gathering of previously scattered data on the rapidly growing ranks of scientists and engineers in China, India, Japan, Singapore, South Korea, and Taiwan. Through expansion of their own universities and training abroad, the report states, the six nations now account for over 500,000 bachelor's degrees in science and engineering per year, double the US output. Of 28,853 science and engineering doctorates awarded in the US in 1990, 3200 were received by students from the six Asian nations, several of which, it is noted, are making special efforts to encourage graduates in the US to return home. The report was prepared by Jean M. Johnson, Senior Analyst in the NSF Division of Science Resources Studies.

Order from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4300; fax 202/634-4683.

School Age Demographics: Recent Trends Pose New Educational Challenges (GAO/HRD-93-105-BR; 91 pp., no charge), from the General Accounting Office (GAO), says that while the population ages 5 to 17 declined by 2.3 million in the 1980s, the proportion of poor children rose by 6 percent, with Hispanic and Asian groups showing the greatest increase. The report, containing extensive data derived from the 1990 census, was requested by Senator Edward Kennedy in connection with reauthorization of the Elementary and Secondary Reeducation Act, which underpins the principal federal school programs.

Also from the GAO: ***Competitiveness Issues: The Business Environment in the United States, Japan and Germany*** (GAO/GGD-93-124; 136 pp., no charge), says government and the private sectors in the latter two nations tend to be more harmonious than is the case in the US, where the "government traditionally has not had a coordinated policy toward business, and its relationship with industry has often been adversarial." The GAO authors stress the difficulties of identifying the potency of various economic, cultural, and regulatory factors influencing competitiveness. Among many observations in the report: "Since the early 1980s, the US federal R&D budget for civilian technology has stagnated, and US companies have generally not made up the difference." Included is a 9-page bibliography of recent literature on competitiveness.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20884-6015; tel. 202/512-6000; fax 301/258-4066.

Academic Medicine and Health Care Reform (four separately bound papers, 6-12 pp. each, no charge), from the Association of American Medical Colleges (AAMC), Washington-based lookout for the medical-school industry, discussions and policy recommendations on: Goals and Principles for Health Care Reform, Graduate Medical Education, Health-Related Research, and Academic Medicine: The Cornerstone of the American Health Care System. A prime theme is that the Clinton reformers should be attentive to the weighty financial needs of academic medicine. Among specific recommendations on other topics: Establishment of an independent, federally recognized National Physician Resources Commission responsible for "setting national goals for both the total number of graduate medical education positions and for the appropriate mix of residency positions..." The papers were produced by an advisory panel chaired by William B. Kerr, Director of the UC San Francisco Medical Center.

Order from: AAMC, 2450 N St. NW, Washington, DC 20037-1126; attn. Betty Lou Atkins; tel. 202/828-0542; fax 202/828-1123.

The Chemical Weapons Convention: Effects on the US Chemical Industry (GPO Stock No. 052-003-01331-2; 69 pp., $4.75), from the Congressional Office of Technology Assessment (OTA), says the Chemical Weapons Convention, which awaits Senate ratification, will require thousands of industrial firms to cooperate with verification procedures, export controls, and other regulatory requirements. OTA warns that a lot of spadework will be required to prepare for compliance and to minimize the burdens on industry. The report, requested by the House and Senate Intelligence committees, notes that no federal funds are available to defray the costs, and that "companies will have to absorb

(Continued on Page 7)